

disclosure. Thus, it will be apparent to those of ordinary skill in the art that the present disclosure is not limited to the exemplary embodiments described above, which have been provided only for illustrative purposes.

[0220] Exemplary embodiments and features as described and illustrated in the present disclosure are only preferred examples, and various modifications thereof may also fall within the scope of the present disclosure.

[0221] The terminology used herein is for the purpose of describing particular exemplary embodiments only and is not intended to limit the present disclosure. It is to be understood that the singular forms “a,” “an,” and “the” include plural references unless the context clearly dictates otherwise. It will be further understood that the terms “comprises” and/or “comprising,” when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

[0222] The terms including any modifiers like “rear” and “front” may be used to explain various components, but the components are not limited by the terms. The terms are only for the purpose of distinguishing a component from another. For example, a rear element, component, region, layer or section could be termed a front element, component, region, layer or section without departing from the teachings of the present disclosure.

[0223] Furthermore, the terms as used throughout the specification, such as “~part”, “~block”, “~member”, “~module”, etc., may refer to a unit that is configured for performing at least one function or operation.

What is claimed is:

1. A display panel comprising:

- a quantum dot color filter layer configured to convert a color of light;
- a transparent front substrate provided at a first side of the quantum dot color filter layer; and
- a low refractive layer provided between the quantum dot color filter layer and the front substrate, the low refractive layer having a refractive index that is lower than a refractive index of the quantum dot color filter layer.

2. The display panel of claim **1**, wherein the refractive index of the low refractive layer falls within a range of between 1.0 and 1.4.

3. The display panel of claim **1**, wherein the low refractive layer comprises a resin within which nano-particles are distributed, and

wherein the nano-particles include at least one from among titanium dioxide TiO_2 and zinc oxide ZnO .

4. The display panel of claim **1**, wherein the refractive index of the low refractive layer is lower than a refractive index of the front substrate.

5. The display panel of claim **4**, wherein the refractive index of the front substrate is higher than the refractive index of the quantum dot color filter layer.

6. The display panel of claim **1**, wherein the light comprises blue light, and

wherein the display panel further comprises a reflective layer provided at a second side of the quantum dot color filter layer that is opposite to the first side of the quantum dot color filter layer, the reflective layer being

configured to transmit blue light therethrough and reflect light that has a wavelength longer than a wavelength of the blue light.

7. The display panel of claim **1**, further comprising an anti-reflective (AR) layer coated on a surface of the front substrate and configured to prevent Fresnel reflection.

8. A display panel comprising:

- a quantum dot color filter layer comprising a plurality of converters and partition walls provided between the plurality of converters, each of the plurality of converters comprising quantum dot particles configured to convert a color of light, and each of the partition walls being configured to absorb light;
- a front substrate provided at a first side of the quantum dot color filter layer; and
- reflective walls which surround the partition walls and are configured to reflect light which propagates toward the partition walls.

9. The display panel of claim **8**, wherein each of the reflective walls includes at least one reflective material from among titanium dioxide (TiO_2), zinc oxide (ZnO), iron oxide (Fe_2O_3), chrome oxide (CrO), cobalt oxide (CoO), stannic oxide (SnO_2), talc, and kaolin ($\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$).

10. The display panel of claim **8**, further comprising a low refractive layer provided between the quantum dot color filter layer and the front substrate and having a refractive index that is lower than a refractive index of the quantum dot color filter layer.

11. The display panel of claim **10**, wherein the refractive index of the low refractive layer falls within a range of between 1.0 and 1.4.

12. The display panel of claim **11**, wherein the low refractive layer comprises a resin within which nano-particles are distributed, and wherein the nano-particles include at least one from among titanium dioxide TiO_2 and zinc oxide ZnO .

13. The display panel of claim **11**, wherein the refractive index of the low refractive layer is lower than a refractive index of the front substrate.

14. The display panel of claim **11**, further comprising an anti-reflective (AR) layer coated on a surface of the front substrate and configured to prevent Fresnel reflection.

15. A display device comprising:

- a back light unit which includes a light source configured to emit light;
- a quantum dot color filter layer configured to convert a color of light emitted from the light source;
- a front substrate provided at a first side of the quantum dot color filter layer that is opposite to a second side of the quantum dot color filter at which the back light unit is provided; and
- a low refractive layer provided between the quantum dot color filter layer and the front substrate, the low refractive layer having a refractive index that is lower than a refractive index of the quantum dot color filter layer.

16. The display device of claim **15**, wherein the refractive index of the low refractive layer falls within a range of between 1.0 and 1.4.

17. The display device of claim **15**, wherein the low refractive layer comprises a resin within which nano-particles are distributed, and wherein the nano-particles include at least one from among titanium dioxide TiO_2 and zinc oxide ZnO .